

Aristotle's Commonsensical Cosmology

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Aristotle's cosmology is, on the one hand, dead as a doornail. After all, among his other claims are these: the heavenly bodies go around the earth on a fixed circular path; they are ontologically superior to, more "honorable" and "divine" than bodies found on earth; they are weightless and eternal. We know these statements to be false, even laughably so. The sun, not the earth, is the center of our solar system, the planets do not move in circular orbits, matter is homogeneous, and stars have both weight and a history. Given these facts, what can Aristotle's cosmology possibly teach us today? Can it ever be anything more than an antiquarian's relic?

The task of this essay is both to examine and defend the philosophical value of the arguments Aristotle makes on behalf of his cosmology in *De Caelo* I.1–3. As such, it is a test, or perhaps a limit, or a worst case scenario for the study of his thought in general. While a contemporary "virtue ethicist" will, for example, readily grant the significance and value of the *Nicomachean Ethics*, an analogous claim made for his cosmology seems impossible. Unlike ethics, western science seems to have progressed so far that it has left Aristotle deeply buried in the dust. This paper will suggest otherwise.¹

The strength of Aristotle's cosmological argumentation lies in its reliance on ordinary experience and commonsense, concepts explored in depth in Stanley Rosen's *The Elusiveness of the Ordinary*.² Simply put, *De Caelo* begins with the phenomena of ordinary experience, and then by means of the syllogism, which itself emanates from ordinary experience, projects these phenomena onto the heavens. The result is thus a commonsensical cosmology, an articulated world in which human beings find themselves essentially at home. Citing the four features of ordinary experience Rosen identifies, one could say that the Aristotelian "heavens" exhibit "the inner connection between truth and goodness, the exemplification of a unified process, regularity, and comprehensiveness" (259) that we are familiar with here on earth.

1 A early inspiration for this paper comes from Paul Feyerabend's essay, "In Defence of Aristotle" in *Progress and Rationality in Science*, G. Radnitsky and G. Andersson (eds); Boston: Reidel, 1978, pp. 144–80.

2 All quotations from Stanley Rosen, *The Elusiveness of the Ordinary* (New Haven: Yale, 2002) will be indicated simply by a page number in parenthesis.

The following sketches the arguments in *De Caelo* I.1–3 that conclude with the statements that the heavenly bodies move in circular orbits and are ontologically superior to those found below the moon. The first three premises contain basic elements of his physics.

1. There are three, and only three, magnitudes or dimensions: Lines are those magnitudes divisible in one way (*eph' hen*: 268a7) or direction; surfaces, in two ways; and bodies, in three. Body is therefore the complete (*teleion*: 268a22) magnitude.³ As we will discuss below, this coupling of the "three" and the notion of completeness, or wholeness, is crucial to the entire argument.

2. Some bodies are natural, some not. Natural bodies have the principle of motion in themselves, and move "according to place" (*kinêsis kata topon*: 268b17), i.e., achieve locomotion. There are two general forms of simple locomotion because there are only two simple magnitudes, namely straight and circular lines. Because motion proceeding on straight lines has two directions, up or away from the center (*apo tou mesou*) and down or towards the center (*epi to meson*), there are three forms of simple motion. Thus, just as "body was completed (*apetelesthê*) by the number three, so now is its motion" (268b25).

3. There are four simple bodies: fire, earth, water and air. There are also complex bodies compounded of these. Each of the simple bodies has a natural form of locomotion, which is also simple. Fire and air move upwards in straight lines, while earth and water move downwards in straight lines. Because there are three forms of locomotion, there must be "a simple body naturally so constituted as to move in a circle in virtue of its own nature" (269a7).

These dense passages are difficult to unpack. They rely on Aristotle's definition of a natural being as one with the principle of motion and rest within itself (see *Physics* II.x), his doctrine of the four elements, i.e., his proto-chemistry, and his notion of a natural place and a corresponding natural motion. Implicit as well is the location of the earth at the "center" of the world. For the moment, however unlikely these assertions may seem, let them stand as is. They will be discussed near the end of this essay. What is most relevant now is the way Aristotle argues. In that regard, let us move forward.

4. The simple body that moves in a circle must be composed of a fifth element unlike the four sublunary ones, all of which naturally move in straight lines.

3 All citations from *De Caelo* come from the Loeb Edition, translated by W.K.C. Guthrie (Cambridge, 1986). As is always the case with Loeb citations, line numbers are not entirely precise.

5. Circular motion is "primary" because the circle, unlike any other figure composed of straight lines, is complete (*teleion*: 269a20). An infinite line cannot be complete for the obvious reason that it has no end (*telos*), and a finite line segment can always be extended (269a23). Because "a motion which is prior to another is the motion of a body prior in nature," heavenly bodies are "more divine than and prior to" (269a32) sublunary ones.

6. Aristotle sums up: "Thus the reasoning (*sullogizomenos*) from all our premises goes to make us believe (*pisteuseien*) that there is some other body separate from those around us here, and of a higher (*timiōteran*) nature in proportion as it is removed from the sublunary world (269b15)."

What is striking about these arguments is, as Aristotle himself indicates in 6., how "syllogistic" or "logical" they are. By assuming that there are three kinds of simple locomotion (up, down, around) and that the four sublunary elements all move in straight lines, a "slot" is open and must be filled: something must move in a circle, and by this reasoning only the heavenly bodies are available to perform such a task.

In order to attribute the qualities of weightlessness and eternity to these bodies, Aristotle argues as follows:

7. The heavy is "that whose nature it is to move towards the center, the light that whose nature it is to move away from the center" (269b25). Because all simple bodies have only one natural motion, the heavenly bodies moving in a circular orbit have no weight.

8. The opposite of up is down, and of down up. But the circle has no opposite. Because "everything that is generated comes into being out of an opposite" and "opposites have opposite motions" (270a15), the heavenly bodies moving in circular orbits are neither generated nor perish. "It looks then as if nature correctly exempted from the class of opposites that which was to be ungenerated and indestructible" (270a20).

To appreciate the nature of Aristotle's argumentation, it is useful first to consider some objections to it. Recall, for example, Francis Bacon's classic complaint in the *New Organon* I.13: "the syllogism is...no match for the subtlety of nature. It commands assent therefore to the proposition, but does not take hold of the thing." For Bacon, syllogistical science fails to apprehend the truth about nature because it is essentially anthropomorphic. It projects human understanding onto a field in which it does not belong. More specifically, "the human understanding is of its own nature prone to suppose the existence of more order and regularity in the world than it finds." Bacon's example of this tendency to

error is Aristotelian: "Hence the fiction that all celestial bodies move in perfect circles" (I.45).⁴

On the one hand, Bacon is quite right in his diagnosis: Aristotle's cosmological arguments are syllogistic. Because there are three forms of simple motion, something must move in a circle and logic, not ruthlessly empirical observation, dictates that this cannot be composed of a sublunary element. Such argument does indeed "suppose" a strong sense of "order and regularity." Because wholeness is triadic, and because the "cosmos" is just that, namely an ordered whole, there must be three dimensions and three forms of simple motion. The heavenly bodies move in a circular orbit because the argument dictates that something must.

Bacon is also right to characterize this sort of reasoning as anthropomorphic. It projects a human conception of order onto the heavens. As we shall see, rather than being its weakness, this is precisely the argument's strength.

Aristotle's cosmology discloses celestial phenomena as they show themselves in ordinary experience. It explains the shape of the human, naked-eye, earth-bound, and commonsensical encounter with the world around and the sky above. To elaborate, let us return to the first claim made above, namely that there are only three dimensions, and that threeness and completeness form a conceptual pair. Aristotle defends this, the crucial premise of the entire argument, with the following:

(1) "There is no magnitude not included in these [the three dimensions]; for three are all (*to ta tria panta einai*) and 'in three ways' (*to tris*) is the same as 'in all ways' (*pantēi*). For just as the Pythagoreans say, the all and all things has been determined (*hōristai*) by the number three. For end (*teleutē*), middle (*meson*) and beginning (*archē*) hold the number of the all, and their number is three. Hence it is that we have taken this number from nature, as it were one of her laws (268a9–13)."

The entire argument rests on the proposition that "three are all." This in turn depends on Aristotle's conception of the "all" or the "whole."⁵ A whole is a unity of parts, a structure constituted by a beginning, a middle and an end. Aristotle neither explains what he means here nor defends his claim. He must, then, take it as a given. But of what sort? I suggest it is a given of our ordinary experience

4 I do not suggest that Aristotle alone devised the notion of circular orbits. The Babylonians probably conceived of the great circle or belt of the zodiac with its twelve constellations. Anaximenes had a notion of the rotating sphere. Eudoxus conceived of the sun, moon, and five planets occupying a set of ideal concentric spheres uniformly rotating the earth.

5 In this context the two words can be treated as synonyms, although Aristotle differentiates them in *Metaphysics* V.xxvi. Clearly his definition of the "whole" in that context applies to the pan as discussed in *De Caelo*.

which, just as Rosen has it, requires unity or wholeness. To elaborate and explain, we must look elsewhere in Aristotle's writings.

Consider, for example, how Aristotle initially defines tragedy in the *Poetics*: it is an "imitation of an action (*praxeōs*) that is serious, complete (*teleias*) and of a certain magnitude . . ." (1449b25). Later he reformulates: "tragedy is an imitation of an action that is complete and whole (*holēs*: 1450b25)," and he defines a whole in the same terms he uses in *De Caelo*: "that which has a beginning, middle and an end" (1450b27).⁶

A good tragedy must have a unified plot (*muthos*) structure. Plot, "the arrangement (*sunthesin*) of the incidents" (1450a5), is also described as an "imitation of the action" (1450a4), and so it becomes the central element, or as Aristotle calls it, the "soul" (1450a37), of tragedy as such. Without a unified narrative or plot, a drama is no more than a string of episodes. It is not only a bad piece of work, but also a lifeless one.

A good tragedy requires narrative unity because it is an imitation of a *praxis*. Like many of Aristotle's critical terms, this one is equivocal. In the broadest sense, it can refer to any kind of "doing" whatsoever. It names, for example, the activities of animals (*Historia Animalium* 487a10). In the narrowest sense, such as is found in *Nicomachean Ethics*, III.1 (the discussion of the voluntary and involuntary), it refers only to those specific actions human beings perform. There is, in addition, an in-between sense, namely as a human life conceived neither as an isolated action, nor as a sequence of merely biological activities, but as the consistent and characteristic pattern of activity a human being engages in over a long period of time. This is the sense Aristotle has in mind when he says in the *Politics* (1325a32) that "happiness is a *praxis*." Happiness does not occur in an isolated or single moment. It is the work of a life-time. This sense of *praxis* comes close to what Aristotle calls *energeia* in his definition of happiness in the *Ethics* as "*energeia* in conformity with virtue" (1098b31).⁷

A tragedy imitates a *praxis* (or a portion of *praxis*) in this last sense. It must have a unified plot structure because *praxis* conceived as a human life is a unified whole. In a chronological sense, a life has a beginning, a middle and an end. We begin in childhood, we mature, and at the end of our lives we decline. In order for our lives to have any sort of practical unity and meaning, there must be a coherent structuring of these parts. Human life, in other words, must have a narrative structure. We must be able to tell our "stories." When it comes to an excellent human being, such a story would have three main chapters: a childhood spent in the successful absorption of a set of good habits inculcated by an attentive community; a middle age spent flourishing, i.e., doing everything well that an

6 Translations from the *Poetics* are my own. The Greek text is S. Butcher, *Aristotle's Theory of Poetry and Fine Art* (NY: Dover, 1951).

7 Translations from the *Nicomachean Ethics* are my own. The Greek text is I. Bywater, *Aristotelis "Ethica Nicomachea"* (Oxford: Clarendon Press, 1962).

excellent human being can and therefore should do; and an old age facing decline and its inevitable suffering as well can possibly be expected.

As Rosen puts it, "the stories that we tell about ourselves are made possible by certain pervasive traits of ordinary experience" (259). Primary among these traits are "unity and regularity" (266). For human life to have "meaning and value" (267) it must be a unity of parts; it must be a whole. Consequently it must have, broadly speaking, a beginning, middle and end.

To return to *De Caelo*: Aristotle begins with the phenomenon of wholeness as threeness. He then projects this phenomenon onto the cosmos as such. Although it is not chronological, the world has a story: it makes sense. The various elements fit in their proper place. Again, Rosen is helpful in articulating this Aristotelian, this anthropomorphic, move.

The unity and regularity of *praxis*, the domain of intellectual activity through speeches and deeds, is itself dependent upon the unity and regularity of existence, to which we sometimes refer...as the order of nature (266).

Consider a second example. In the *Nicomachean Ethics* Aristotle defines moral virtue as "a stable disposition involving choice and consisting in the mean relative to us" (1106b36). (The word *meson* (1106b7) can also be translated, as it is in *De Caelo*, as "center.") The mean is in-between excess and deficiency. So, for instance, courage is the mean in-between fearing too much (cowardice) and not fearing enough (recklessness). Like its narrative counterpart, the moral life is structured triadically. The moral life can be lived well because moral questions can be answered well. An excellent human being has good judgment and so when facing a moral question—e.g., should I give money to the beggar?—can attain the right answer. Because a right answer is possible, two wrong answers are also possible. One can give too much or too little to the beggar.

Aristotle no more defends (in a logical sense) the notion of the moral mean in the *Ethics* than he does the statement "three is all" in *De Caelo*. He takes it as a given. This is because he has such a strong sense of the intelligibility and the meaningfulness, which in turn require the wholeness, of the moral life. To explain, consider his argument on behalf of the "highest good" in *Ethics* I.2:

If then among our actions there is some end which we wish for because of itself, and because of which we wish for everything else, and if we do not choose everything because of something else—since if we did it would go on indefinitely, and as a result desire would be empty and vain—clearly this would be the highest good (1094a18-22).

This argument is an enthymeme. Its suppressed premise—suppressed because Aristotle takes it as evident—is that desire is not empty or vain, that life has

meaning. Therefore, the sequence of ends or goods—A is for the sake of B, which is for the sake of C, and so on—cannot be infinite. It must stop, and so can in principle be completed.

Aristotle allows this supposition because he takes it to be phenomenologically evident. Human beings consistently appear to act as if their decisions matter and their desires are neither futile nor pointless. If the sequence of ends or goods were infinite, then no good or end, and hence no desire, would matter more than any other. After all, compared to (divided by) infinity any finite good is equivalent to nothing. In short, human life, as it is actually experienced, appears to have meaning.

(To be specific: the English “meaning” has two basic senses. The first is the semantic, as in “the word ‘table’ means ‘a flat top placed on legs.’” And there is the purposive: “I meant to turn the lights off.” Both senses are operative in the phrase “life has meaning:” it is both purposive and its purposive structure can be explained or articulated.)

Because life is experienced as meaningful, good judgment on moral matters is possible. Therefore, Aristotle implicitly argues, a mean in-between excess and deficiency is the basis or the target of such good judgment. The moral life is intelligible: it is presented in ordinary experience as a triadic whole.

Rosen again captures these features of ordinary life. “At all levels of conscious activity, we prefer correctness or truth to incorrectness or falsehood. . . . Human activity is intrinsically a process of ‘trying to get it right’” (262). From these commonsensical observations, Rosen infers, “The goodness of reason is directly visible at the level of ordinary experience” (260).

These remarks are thoroughly Aristotelian in spirit. When it comes to practical decisions, “trying to get it right” implies hitting the “center” or the “mean:” not too much, not too little.

A third way in which triadic wholeness is given to us by the phenomena is more directly related to *De Caelo*, namely the human experience of place (*topos*) and the directionality attendant upon it. Because we occupy, and are aware of occupying, a place in the world, and because we can move from place to place, we experience ourselves as located in a center that is flanked. We experience place directionally. Above us is up; below us is down. To one side of us is left, to the other is right.

These directions, which are meaningless or arbitrary in a modern physics of infinite space, are constitutive of Aristotle’s cosmos. As mentioned above, there are two forms of simple locomotion corresponding to two simple lines: the straight and the circle. Air and fire naturally move up, “away from the center.” Earth and water move down, “towards the center.” The moon is above us, the earth below our feet. (Furthermore, the universe revolves from right to left, from east to west: see II.11.)

The kind of reasoning exemplified above (and the examples could be multiplied)⁸ provides a Baconian critic with a ready target, one almost too easy to hit. Aristotle attributes what seem to be merely anthropomorphic and arbitrary characterizations of directionality—to the left *of me*, right *of me*, above and below *me*—to the cosmos itself. On the one hand, such criticism is again quite right. On the other, if Aristotle’s cosmology can be defended as anything other than an interesting relic, it would have to be along just these phenomenological lines. The cosmos, as we experience it from earth, does have a center. The earth is the center, not of an infinite universe, but of our lives. The sun rises in the east and moves across the sky, setting in the west. The stars are above us because in order to see them we must tilt our head backwards, and look up and away from our own bodies on earth. They must be made of “different stuff.” After all, unlike anything else on earth, they do not move in straight (or compounded) lines, and they do not fall down. Fire does naturally move upwards. After all, in lighting a cigarette we position the match under it.

To return to *De Caelo*: Aristotle’s argument on behalf of triadicity continues with the following:

(2) Natural language supports the contention that “three is all,” for of two things we say “both” not “all.” This latter term we employ only when at least three are in question. In speaking thus, we are accepting “nature herself for our guide” (268a11–20).

Aristotle summons a feature of natural language, more prominent in Greek than English (because of the former’s use of the dual), to solidify his cosmological argument. Of two objects, we typically say “both” rather than “all.” If I ask you, “which of your eyes hurt?” you might answer “both do.” You would not say “all do.” If I ask you, “which of your fingers hurt?” you might well say “all do.” From this observation of ordinary language, Aristotle concludes that threeness is constitutive of “allness” or “wholeness.” Again, this is because an all or whole is a unity of parts, and this requires a beginning, middle and end. These terms need not be interpreted chronologically or linearly. The key is that there must be some “middle,” some connection between the other two. As Rosen puts it, “unity is in fact a unity of differences” (271). In order for a pair to become an all there must be more than just the two items: there must be a principle, a means of uniting them in their difference. There must be a third.

In a different vein, but also relying on the epistemic value of ordinary language, Aristotle says this:

8 Human temporality of course provides another example. Time is experienced triadically, with a present—a center, where we are now—flanked by the past and future.

It seems too that the name of this first body has been passed down to the present time by the ancients, who thought of it in the way as we do, for we cannot help believing that the same beliefs (*doxas*) recur to men not once nor twice but over and over again... Thus they, believing that the primary body was something different from earth and fire and air and water, gave the name *aither* to the uppermost region, choosing its title from the fact that it 'runs always' (*aei thein*) (270b15-25).

Of course, the Baconian critic would find it a horrible mistake to project features of Greek or English onto the "screen" of non-human nature. This, however, is a central principle of Aristotelian "phenomenology." The phenomena for Aristotle, as several commentators have argued, are drenched in language.⁹ How something appears is not only closely related to what "we" say about it, but also suggestive of the nature of reality itself. The fact that "we" do not call a pair an "all" has epistemic force. Indeed, this use of the "we" is common in Aristotle. "We," for example, speak of four causes; this is evidence that by nature there are four causes. (See *Physics* 195a4.) "We" have ten basic modes of predication. There really are ten categories. (See *Categories* 1b25.)

(3) Aristotle cites religious phenomena on behalf of his cosmological claim: "[We] make use of [the three] even for the worship of the gods" (268a15).

Even if this is a reference to the Greek practice of taking oaths to the heroes, gods and to Zeus, its significance goes further. As Aristotle will later assert, "all men have a conception of the gods, and all assign the highest place to the divine" (270b5). Because gods are above there must be a mediation between heaven and earth. In other words, there must be a beginning, middle and end. Whether this takes the form of animal-human-divine, or mortal-*daimon*-immortal (see *Symposium* 202d), or father-son-holy spirit, religious thinking proceeds triadically.

Speaking specifically about this tendency, but in a way that summarizes much of what has been discussed so far, Aristotle says this:

From what has been said it is apparent (*phaneron*) why, if someone trusts our hypotheses (*ei tis tois hupokeimenois pisteuei*) the primary body of all is eternal, suffers neither growth nor diminution, but is ageless unalterable and impassive. It seems that the argument (*logos*) gives witness (*marturein*) to the phenomena (*ta phainomena*) and the phenomena give witness to the argument. All men have a conception of gods, and all assign the highest place to the divine (270b5).

9 Consider G.E.L. Owen, "Tithenai ta Phainomena," and W. Wieland, "Aristotle's Physics and the Problem of Inquiry into Principles," both in *Articles on Aristotle*, Vol. I, ed. J. Barnes (1975: Duckworth), pp. 113-40.

The *logos* gives witness to the phenomena, and *vice versa*. Both the phenomena and the phenomenology can be trusted to inform us of the way things are.

The phrase "saving the phenomena"—*sôzein ta phainomena, salvare phenomena*—has long been associated with the history of astronomy and its goal of empirical and predictive adequacy. The phrase is inspired (although not used) by Aristotle. But as is apparent from the discussion above, his conception of the phenomena goes far beyond observations of planetary motion. As we have just seen, it includes ordinary language, religion, the naked-eye, earth-bound, finite human experience of space and time. Such is the commonsensical cosmology. Stars are above us and are made of special stuff, water always flows downwards, and the earth is the center of existence...our existence. The world makes sense because wholeness, structured by threeness, is given to us in our ordinary experience. Unless we are in moods of debilitating anxiety, we are largely at home in the world.

The Baconian criticism is, on the one hand, quite right. Aristotle "mingles" the human with the non-human. He projects the human experience of meaning and order, the essential ingredients of commonsense, onto the cosmos itself. The Baconian might well agree with Aristotle's analysis of commonsense, but then deny the move that attaches it to things in the world. Aristotle, by contrast, has enormous confidence that commonsense, the phenomena, the *endoxa*, the way people speak is fundamentally informative of the way things are.

Rosen rightly says that "it is a fundamental condition of human existence that we intend to respond correctly to things, experiences, events, and so on, as they actually are" (263). According to Aristotle, this intention regularly meets with success. As he puts it, "human beings are naturally and sufficiently disposed towards the truth and most of the time attain the truth" (*Rhetoric*, 1355a10).¹⁰ We are beings who live in truth, who "truth" (*alêtheuei*: see *Nicomachean Ethics*, 113915), and so can trust commonsense. He expresses this sentiment as follows:

The study of truth is in one sense difficult, in another easy. This is shown by the fact that whereas no one person can obtain an adequate grasp of it, we cannot all fail in the attempt; each thinker makes some statement about the natural world and as an individual contributes little or nothing to the inquiry; but a combination of all conjectures results in something considerable. Truth is like the proverbial door which no one can miss, in this sense our study will be easy; but the fact that we cannot, although having some grasp of the whole, grasp a particular part, shows its difficulty (*Metaphysics*, 993a30-b10).¹¹

10 Translation is my own. The Greek text is W. D. Ross, *Aristotelis "Ars Rhetorica"* (Oxford: Clarendon Press, 1959).

11 Translation is my own. The Greek text is W.D. Ross, *Aristotle's Metaphysics* (Oxford: Clarendon Press, 1970).

To summarize: Aristotle has enormous confidence in the human capacity to perceive and then to understand accurately the "natural world." Natural beings show themselves to us as they really are. Appearances and the ordinary language used to articulate them can be trusted. We are, most of the time (or "normally"), at home in the world.

This essay must close with some (necessarily inadequate) remarks about the syllogism, the logical means by which the phenomena are projected onto the heavens. Recall that Bacon derides it: "the syllogism is...no match for the subtlety of nature. It commands assent therefore to the proposition, but does not take hold of the thing."

Three lines of Aristotelian response: First, "things" or nature itself is syllogistically arranged, at least insofar as the syllogism expresses the logic of class inclusion. Consider, for example, Aristotle's conception of the hierarchy of living beings or of "souls." All living beings have the "nutritive soul," i.e., share in metabolic activity and reproduction. Animals have in addition a "perceptive soul," minimally the sense of touch, maximally all five senses. Human beings have "mind" in addition. Each of higher order of life must have all the biological functions of those orders below them. A human being engages in metabolic activity and perception. (See *De Anima* II.1-5.)

Syllogisms can easily be extracted from these biological observations. For example: all human beings are animals; all animals engage in metabolic activity; therefore, all human beings engage in metabolic activity. Or: all animals have sense perception; a rabbit is an animal; therefore, a rabbit has sense perception. These are not merely sterile logical formalisms. Instead, they express the order of nature itself.

Second, Aristotle's conception of the syllogism emerges not from an analysis of the abstract forms of thought, but from the give and take of dialectical exchange. Such, at least, is Ernst Kapp's argument. He begins by noting that the *Topics* is the earliest and thus the seminal logical work, and that its purpose is to establish a method for the kind of argumentation that goes on between questioner and responder in a dialectical "game." He then notes that the definition of the syllogism there asserted—namely, "an argument in which, certain things having been laid down, something other than these things necessarily results through them" (*Topics*, 100a25-26)¹²—is virtually the same as that given in the *Prior Analytics*. Equipped with these observations, he concludes:

Thus it happened that at the beginning of systematical logical research a syllogism was not sought and was not found among or within the thoughts of the solitary thinker or in his books or formal lectures, but that the original

12 I follow Forster's translation in the Loeb edition (Cambridge: Harvard University Press, 1976).

subject matter of logic was the "dialectical syllogism," the syllogism that develops in conversation.¹³

The syllogism, then, is not a mere formalism, but an organic development of the way people argue with one another when playing the game of dialectic, which itself is the distillation of the practices of ordinary conversation (and which of course was depicted in the Platonic dialogues.) To quote Kapp again: "logic was originally conceived as science of what happens, not when we are thinking for ourselves, but when we are talking and trying to convince one another."¹⁴

Third: the much maligned syllogism expresses its own kind of wholeness, which like that of good stories, our experience of the intelligibility of the moral life, and of the directionality of place, is triadic in nature. It depends, after all, on a "middle" term.

The remarks above on the nature of the syllogism (which obviously require much elaboration) should clarify the meaning of the verb "project" used throughout this essay. It is not meant to suggest the Freudian sense of transference. Instead, it is intended to bring to mind something like "an overhead projector," one which throws, but retains the form and proportions of, an enlarged image of an original onto a big screen. Aristotle's cosmology uses the syllogism to project an image (an *eikon* not a *phantasm*) of the structure of phenomena familiar to us here on earth onto the heavens. The result is a cosmos, a world infused by commonsense.

To close: in a lecture titled "Philosophy and the Crisis of European Humanity," written in the dreadful year of 1935, Husserl wrote "The European nations are sick. Europe itself, it is said, is in crisis" (270).¹⁵ Husserl was specific in his diagnosis: "The European crisis has its roots in a misguided rationalism" (290).

A materialist, mechanistic conception of nature, studied by a mathematically based science and taking place in an infinite space, not only spawned the powerful technologies we now both take for granted and deeply fear, but has come to dominate western culture itself. Like a giant shadow, modern science and technology have blotted out all other forms of human knowledge and inquiry. Most important, the hegemony of modern science, based always on the paradigm of mathematical physics, has obliterated the possibility of gaining knowledge of the "meaning" of human life itself. For this "meaning" requires natural or ordinary language, and resists mathematical or scientific articulation.

13 Kapp, Ernst. *Greek Foundations of Traditional Logic*. New York, Columbia University Press, 1942), p. 17. Thanks to Bret Doyle who brought this to my attention.

14 *Ibid.*, p. 19.

15 Husserl, E. 1970: *The Crisis of European Sciences as Transcendental Philosophy*. Translated by D. Carr. Evanston: Northwestern University Press.

What Husserl said about Einstein typifies his critique of modern European rationality:

Einstein's revolutionary innovations concern the formulae through which the idealized and naively objectified physics is dealt with. But how formulae in general, how mathematical objectification in general, receive meaning on the foundation of life and the intuitively given surrounding world-of this we learn nothing; and thus Einstein does not reform the space and time in which our vital life runs its course (295).

To make the same point, Husserl says this: "the scientist does not become a subject of investigation" (295). In other words, modern science, always speaking the language of mathematics, "objectifies" the world. It understands how the material things work, but has nothing whatsoever to say about the unique "meaning" or "the vital life" human beings, including the scientists themselves, actually experience. "No objective science can do justice to the very subjectivity which accomplishes science" (295). Modern science is in this sense dehumanizing. It presents the technician with the opportunity to manipulate the natural world, but says and knows nothing about what it is like for a human being actually to live in it.

Consider the simplest possible example, one already mentioned. Since Copernicus we have known that the earth revolves around the sun and so is not, as Aristotle thought, the center of the universe. On the one hand, this scientific fact allows no dissent. On the other hand, it also conceals a compelling truth: for human beings, the center of our daily lives will always be the earth. It is where we live. To describe the dawn, we invariably say "the sun has risen," even though, from an astronomical perspective, this is false. Ordinary life, as well as ordinary language, speak against the Copernican revolution.

The purpose of Aristotle's cosmology is precisely to speak for ordinary life, i.e., to articulate the phenomena and explain how the natural world appears from a human perspective. What Aristotle achieves is exactly what Husserl called for, namely a *logos*, a rational account, of how the world presents itself to earth-bound human beings. Unlike the modern scientist and, as Rosen has argued, far better than the twentieth century phenomenologist, Aristotle can explain what the world means to us.¹⁶ For him, the scientist, as well as the experience of the ordinary human being, is indeed "a subject of investigation."¹⁷

16 Rosen's critique of Husserl perhaps could be summarized thus: "the ordinary is . . . replaced within philosophical analysis by a theoretical artifact" (1-2). Aristotle, by contrast, allows the ordinary to speak for itself.

17 I trust Stanley Rosen would not be entirely displeased with the sentiments of this paper. But if there are mistakes, either in its reasoning or its reading of Aristotle, they are surely mine alone.